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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,623	09/27/2001	Charles D. Murphy		9721

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ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _09/27/01; 12/12/01; 04/09/02; 06/14/02_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-32_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-32_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _9/27/01_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Drawings

1.   The subject matter of this application admits of illustration by a drawing to facilitate

understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81 to

illustrate the claim invention. No new matter may be introduced in the required drawing.

Claim Objections

2.   Claims 1, 6, 9-10, 13, 17, 22, 25-26, and 29 are objected to because of the following

informalities:

Re claim 1, the applicant is advised to put a (;) in every index limitations (e.g.

page 26 line 5 "multiplier-defined restricted set" as "multiplier-defined restricted set;")

and a word "and" at the last index limitation (e.g. page 26 line 20 "more than one

member" as "more than one member; and"). Claims 9-10, 13, 17, 25-26, and 29 has the

same objection as claim 1.

Re claim 6, the applicant is advised to replace the phase "the negative" in page 27

line 2 as "a complement" for clarification. Claim 22 has the same objection as claim 6.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
subject matter which the applicant regards as his invention.

4.   Claims 1-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Re claim 1, the terms "can" in line 9 and "cannot" in line 13 in claim 1 is a

relative term which renders the claim indefinite. The terms "can" or "cannot" are not

defined by the claim, the specification does not provide a standard for ascertaining the

requisite degree, and one of ordinary skill in the art would not be reasonably appraised of

the scope of the invention. For examination purposes, the examiner considers the terms

as "would" and "would not" respectively. Claim 17 has the rejection as claim 1.

Thus, claims 2-10, 12-16, 18-26, and 28-32 are also rejected for being dependent

upon the rejected base claims 1 and 17 respectively.

Re claim 11, the word "means" is preceded by the word(s) "constant multiplier"

and "general multiplier" in lines 5-6 in an attempt to use a "means" clause to recite a

claim element as a means for performing a specified function. However, since no

function is specified by the word(s) preceding "means," it is impossible to determine the

equivalents of the element, as required by 35 U.S.C. 112, sixth paragraph. See *Ex parte

Klumb*, 159 USPQ 694 (Bd. App. 1967). Claim 27 has the same problem.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-8, 10, 12-24, 26, and 28-32 are rejected under 35 U.S.C. 102(b) as being

anticipated by Richardson (U.S. 5,262,973).

Re claim 1, Richardson discloses in Figure 5 a machine used in computing one of

more sums of products (claim 1 pre-amble) wherein at least one of sums of products is

not a desired product of two numbers (abstract) comprising: a. a first number (e.g. 640 as

X) represented in a first finite-precision numeric format (col. 2 lines 25-30), first number

being a member of a first multiplier-defined restricted set (e.g. any finite numbers except

0, -1, 1, NAN, -inf, and +inf); b. a second number (e.g. 650 as Y) represented in a second

finite-precision numeric format (col. 2 lines 25-30); c. first multiplier means (500) for

computing a first product equal to the product of first number and second number (e.g. Z

= X * Y), where; i. first multiplier means can compute the product of a first multiplier

input and a second multiplier input when the first multiplier input is any number from

first multiplier-desired restricted set and the second multiplier input is second number

(e.g. belong to the restricted set, no halt signal is generate which enable 500); ii. first

multiplier means cannot compute the product of a first multiplier input and a second

multiplier input when the first multiplier input is not a member of first multiplier-defined

restricted set, the second multiplier input is second number, the first multiplier input has

numeric value not equal to zero, and the second multiplier input has numeric value not

equal to zero (e.g. when x or y or x and y are 1, the halt signal is generate to bypass the

multiplication 500); iii. first multiplier-defined restricted set has more than one member

(e.g. 2, 3, 4..); and iv. first multiplier-defined restricted set does not include all the

members of a first unrestricted set (inherent for limited set of memory), first unrestricted

set including all numbers having first finite-precision numeric format and not including

numbers in other finite-precision numeric formats (e.g. 0, 1, -1); whereby first product

may be computed with reduced complexity compared to computation of first product

using general multiplier means, general multiplier means being able to compute the

product of second number and any member of first unrestricted set (abstract lines 6-13).

Re claim 2, Richardson further discloses in Figure 5 first multiplier-defined

restricted set includes a number having a numeric value zero (e.g. 510 or 540).

Re claim 3, Richardson further discloses in Figure 5 first multiplier-defined

restricted set includes a first member having numeric value not equal to zero, positive

one, or negative one and a second member having numeric value that is not equal to zero,

positive one, or negative one (510 to 560).

Re claim 4, Richardson further discloses in Figure 5 first multiplier-defined

restricted set has exactly two members (e.g. 2 and 3).

Re claim 5, Richardson further discloses in Figure 5 one member of first

multiplier-defined restricted set is a number having a numeric value zero (e.g. 510 or

540).

Re claim 6, Richardson further discloses in Figure 5 each member of first

multiplier-defined restricted set is the negative of the other member (e.g. –1 and 1).

Re claim 7, Richardson further discloses in Figure 5 each member of first

multiplier-defined restricted can be obtained by shifting the representation element values

of the other member (e.g. 1 shift right would be 0).

Re claim 8, Richardson further discloses in Figure 5 first multiplier-defined restricted set has more than two members (e.g. 2, 3, 4…).

Re claim 10, Richardson further discloses in Figure 5 a third number represented in a third finite-precision numeric format, third number being a member of a second multiplier-defined restricted set b. a fourth number represented in a fourth finite-precision numeric format c. second multiplier means for computing a second product equal to the product of third number and fourth number, where i. second multiplier means can compute the product of a first multiplier input and a second multiplier input when the first multiplier input is any number from second multiplier-defined restricted set and the second multiplier input is fourth number second multiplier means cannot compute the product of a first multiplier input and a second multiplier input when the first multiplier input is not a member of second multiplier-defined restricted set, the second multiplier input is fourth number, the first multiplier input has numeric value not equal to zero, and the second multiplier input has numeric value not equal to zero iii. second multiplier-defined restricted set has more than one member whereby first product and second product may be computed with lower complexity than if general multiplier means were used to compute each product (e.g. the third number and a fourth number are just another set of operands with selective number(s) in the sets).

Re claim 12, Richardson further discloses in Figure 5 first multiplier-defined restricted set and second multiplier-defined restricted set do not have any common members (e.g. two separate sets contain separate members S1{odd} and S2{even}).

Re claim 13, it has the similar limitations cited in claim 1 for the second number of the second multiplier-defined restricted set (e.g. Y). Thus, claim 13 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 14, it has the similar limitations cited in claim 2 for the second number of the second multiplier-defined restricted set (e.g. Y). Thus, claim 14 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 15, it has the similar limitations cited in claim 3 for the second number of the second multiplier-defined restricted set (e.g. Y). Thus, claim 15 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 16, it has the similar limitations cited in claim 4 for the second number of the second multiplier-defined restricted·set (e.g. Y). Thus, claim 16 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 17, it is a method claim of claim 1. Thus, claim 17 is also rejected under the same rationale as cited in the rejection of rejected claim 1.

Re claim 18, it is a method claim of claim 2. Thus, claim 18 is also rejected under the same rationale as cited in the rejection of rejected claim 2.

Re claim 19, it is a method claim of claim 3. Thus, claim 19 is also rejected under the same rationale as cited in the rejection of rejected claim 3.

Re claim 20, it is a method claim of claim 4. Thus, claim 20 is also rejected under the same rationale as cited in the rejection of rejected claim 4.

Re claim 21, it is a method claim of claim 5. Thus, claim 21 is also rejected under the same rationale as cited in the rejection of rejected claim 5.

Re claim 22, it is a method claim of claim 6. Thus, claim 22 is also rejected under the same rationale as cited in the rejection of rejected claim 6.

Re claim 23, it is a method claim of claim 7. Thus, claim 23 is also rejected under the same rationale as cited in the rejection of rejected claim 7.

Re claim 24, it is a method claim of claim 8. Thus, claim 24 is also rejected under the same rationale as cited in the rejection of rejected claim 8.

Re claim 26, it is a method claim of claim 10. Thus, claim 26 is also rejected under the same rationale as cited in the rejection of rejected claim 10.

Re claim 28, it is a method claim of claim 12. Thus, claim 28 is also rejected under the same rationale as cited in the rejection of rejected claim 12.

Re claim 29, it is a method claim of claim 13. Thus, claim 29 is also rejected under the same rationale as cited in the rejection of rejected claim 13.

Re claim 30, it is a method claim of claim 14. Thus, claim 30 is also rejected under the same rationale as cited in the rejection of rejected claim 14.

Re claim 31, it is a method claim of claim 15. Thus, claim 31 is also rejected under the same rationale as cited in the rejection of rejected claim 15.

Re claim 32, it is a method claim of claim 16. Thus, claim 32 is also rejected under the same rationale as cited in the rejection of rejected claim 16.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being obvious over Richardson (U.S. 5,262,973) in view of Deutsch et al. (U.S. 4,031,377).

Re claim 9, Richardson further discloses in Figure 5 first multiplier-defined restricted set has a first member and a second member with the following properties: a. first member is not an integer multiple of second member (e.g. $X = 3$) b. second member is not an integer multiple of first member ($Y = 5$) whereby first multiplier-defined restricted set has at least two members. Richardson does not disclose that the multiplication is related by at least one shift and one addition. However, Deutsch et al. disclose a multiplication that are related at least one shift and one addition in Figure 1. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a multiplication using at least one shift and one addition as seen in Deutsch et al.'s invention into Richardson's invention because it would enable to increase the system performance and simplify the hardware circuit (col. 2 lines 25-34).

Re claim 25, it is a method claim of claim 9. Thus, claim 25 is also rejected under the same rationale as cited in the rejection of rejected claim 9.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

     a.   U.S. Patent No. 6,223,197 to Kosugi discloses a constant multiplier, method and device for automatically provid8ing constant multiplier and storage medium storing constant multiplier automatic providing program.

     b.   U.S. Patent No. 6,629,120 to Walster et al. disclose a method and apparatus for performing a mask-driven interval multiplication operation.

     c.   U.S. Patent No. 6,714,957 Lohman discloses a system and method for efficient processing of denormal results as hardware exceptions.

     d.   U.S. Patent No. 6,658,443 to Walster discloses a method and apparatus for representing arithmetic intervals within a computer system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

                                          Chat C. Do

Examiner
Art Unit 2124

July 27, 2004